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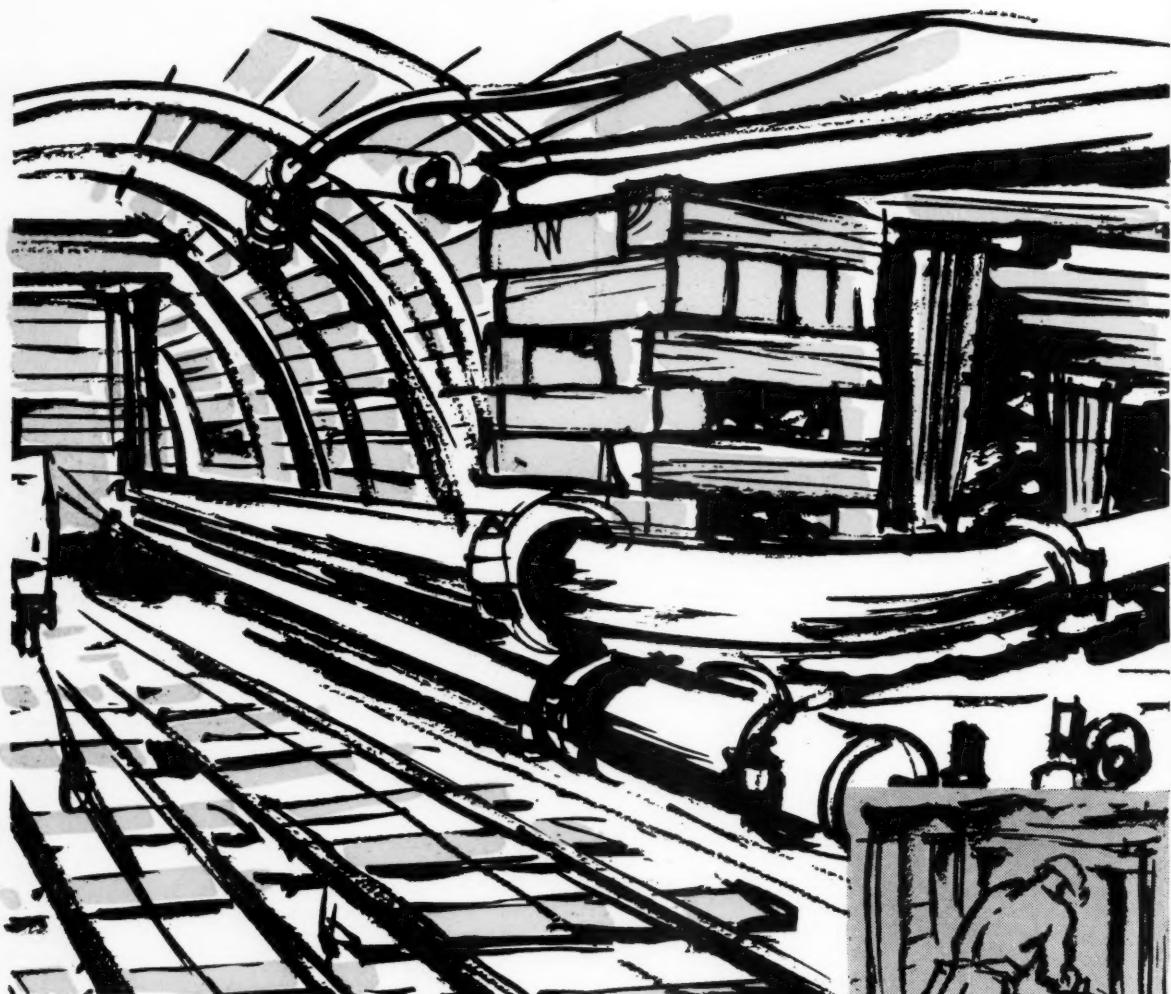
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The Mining Journal

London, February 13, 1959

In this issue . . .

Synthetic Diamonds in Perspective	167
Protection for Overseas Investment	168
The Moroccan Mining Scene	168
The Copper Flower Aids Prospecting	169
Base Minerals in Southern Rhodesia	170
Sponge Iron Production	173
Tin in Atomic Fuel Elements	174
Machinery and Equipment	175
Mining Miscellany	176
Coming Events	177
Metals and Minerals	178
London Metal and Ore Prices	178
Mining Finance	180
Company Meeting	181
Book Reviews	182

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Synthetic Diamonds in Perspective

OME misapprehension as to the probable impact of synthetic bort on the diamond trade may have been caused by a report in an American newspaper in which it was claimed that competition from this new source had weakened the position of the De Beers' Central Selling Organization on the U.S. market for industrials, thus compelling the South African company to offer special concessions to customers.

That the present situation in regard to synthetics is entirely in line with previous expectations emerges very clearly from the following statement reproduced from *The Mining Journal Annual Review, 1958*, which was published in May last year: "Production of synthetic diamonds by the General Electric Co. in 1958 is expected to be about 3,500,000 cts. At present, these synthetics are some 40 per cent dearer than bort, but the price was recently reduced to 24s. 10d. per ct. The average synthetic diamond is less than 1/16 of a ct. in weight and rarely more than 1/16 in. long".

The latest news from America suggests that last year's output of synthetics by General Electric was considerably lower than the figure mentioned in our *Annual Review*. According to *The Wall Street Journal*, the actual quantity manufactured has not been disclosed by the company, but an appraisal from customers puts it at 750,000 cts. This compares with an estimated 7,000,000 cts. of bort shipped to the U.S. last year by the De Beers' Central Selling Organization. The newspaper adds, however, that, following its initial success, General Electric has announced its readiness to produce up to 3,500,000 cts. of industrial diamonds this year if its customers want them and there is evidence that the demand for synthetics is strong.

In assessing the implications of General Electric's process it is interesting to recall Mr. H. F. Oppenheimer's observations on synthetics at the annual meeting of De Beers last year. In expressing his appreciation of the U.S. company's remarkable achievement in producing synthetic diamonds, Mr. Oppenheimer pointed out that the artificial product consisted of abrasive material which competes with the so-called crushing bort produced principally by the Société Minière du Béceka. There was no question, so far as he was aware, of the synthetic production of the larger sizes and better qualities of industrials. He added that in the past the chief limitation on the use of diamonds for abrasive purposes had been the shortage of supply and expressed the view that there might well prove to be room in the market both for the natural and the synthetic product.

The Wall Street Journal describes General Electric's products as "discoloured diamonds the size of grains of sand, which can be used only as abrasives", and it is clear from Mr. Oppenheimer's remarks that in the foreseeable future competition from this source in all probability will continue to be confined to bort. It is generally supposed that the value of bort sales by the Central Selling Organization ranges between 25 and 30 per cent of its total industrial sales. Since the Belgian Congo is responsible for over 90 per cent of the world output of crushing bort, the extent to which synthetics could compete on a price basis with natural

diamonds, in the event of any serious challenge arising, must depend in the last resort on how cheaply the Congo can produce. Since the Société Minière du Béeka recently increased its productive capacity substantially, the Central Selling Organization must certainly have some room for manœuvre in a price war.

We have no precise information as to the cost of manufacturing synthetic bort, but when commercial production first started it must have been at least twice as high as the De Beers' selling price of 20s. a ct. for the natural material. It is reasonable to believe that experience gained by General Electric during the factory's first year of operation may have led to considerable economies in manufacture, but it seems probable that production costs are still substantially higher than the company's ruling price of 22s. 9d. for synthetic bort, more especially since the low level of sales last year suggests that the factory must have been operating well below capacity.

We understand that there is no foundation for the allegation that the Central Selling Organization has been offering special concessions to customers, or that its operations have been cut back under pressure. So far as the price of natural bort is concerned, this has remained unchanged since August, 1957, when it was raised to the present figure of £1. A more accurate picture of the past year's operations is that the American recession caused a temporary decline in the consumption of industrial diamonds, which was reflected by a reduction in the Central Selling Organization's U.S. sales.

That price is by no means the sole consideration governing American buying policy is underlined by the fact that General Electric's share of the domestic market last year amounted to as much as 10 per cent, despite the higher cost to consumers of the synthetic product. The explanation is, of course, that in the case of essential commodities, the American Government and American industry are often willing, for strategic reasons, to pay more for products of domestic origin in order to reduce their dependence on overseas sources. There is doubtless a limit, however, to the premium which American consumers would be prepared to pay for synthetic bort, more especially if the danger of war should recede.

In any case, the position in regard to synthetics, as we have already shown, constitutes no immediate threat to the De Beers' organization which, even during a year of recession such as 1958, was still able to retain nine-tenths of the American trade despite competition from the new artificial product. We believe with Mr. Oppenheimer that, in a world with steadily rising needs, there will be ready markets for natural bort, even if the production of synthetics continues to expand.

PROTECTION FOR OVERSEAS INVESTMENT

At a time when under-developed regions are urgently in need of overseas capital to finance ambitious programmes of industrialization and public works, private investors in the United Kingdom and elsewhere have tended to become increasingly selective as to the countries which they are prepared to entrust with their money. This attitude is wholly understandable, having regard to the heavy losses incurred by shareholders in the many foreign undertakings which have been nationalized with little or no compensation. In view of these unfortunate experiences, it is scarcely surprising that, on the principle of once bitten twice shy, investors should regard political security as a prime consideration.

So far as financial assistance is concerned, it can be stated as a broad generalization that, within reason, the reluctance of private investors will not prevent the under-developed countries from obtaining sufficient capital in the form of grants or loans to carry out their programmes of economic advancement. Whether directly or through such international agencies as the World Bank, the United States and British Governments are contributing immense sums to the economic development of backward territories, as also are Canada and other Western powers. For any country which the West sends empty away, there is a fairy godmother waiting beyond the Iron Curtain, only too ready to come forward with tempting proposals.

The question, therefore, is not so much whether the money will be forthcoming as whether it is to be provided by the British or American taxpayer or by private investors. There can be no doubt as to which is the more desirable. Money taken from the taxpayer's pocket is merely a financial contribution towards the cost of the project. On the other hand, risk capital contributed by private investors is normally accompanied by the technical assistance and know-how which are no less valuable to an economically backward territory than financial aid.

This in itself, quite apart from any other consideration, makes it desirable that the flow of risk capital into the under-developed countries should be encouraged, and this can only be done by removing the fear of nationalization, which has become the greatest deterrent to private investors.

A warm welcome should therefore be accorded to the charter for overseas investment which has been drawn up by Sir Hartley Shawcross, former British Attorney-General, together with a group of British lawyers. The charter, which will shortly be examined by O.E.E.C. experts, seeks to provide international agreement on safeguards for private investors. Provision might be made for any disputes to be taken to the International Court at The Hague.

Agreement on protection for private capital by a group such as the 17 O.E.E.C. countries would be a valuable beginning, which might be followed later by many African, Asian and Arab countries in need of outside investment.

The first step, however, is to gain the support of O.E.E.C. At this early stage, all that can be said is that the drafting of the charter by such eminent jurists is in itself an encouraging and practical approach to a problem which urgently calls for solution. It is an attempt which must not be allowed to fail.

THE MOROCCAN MINING SCENE

A spectacular increase in phosphate production and exports during 1958, and the prospect of reaching a record peak of 7,500,000 tons exported in the current year, are the dominant features of the Moroccan mining scene at present.

On the other hand, production of other important minerals such as iron ore and manganese ores fell substantially in 1958 compared with the previous year, and for these and other mineral products the coming year promises to bring serious marketing problems, due in the main to Morocco's new monetary status.

In January, just after the French Government announced its devaluation by 17.55 per cent, the Moroccan authorities decided to maintain the Moroccan franc at 420 to the \$ U.S., i.e. to make a 17.55 per cent disparity between Moroccan and French currencies, which had hitherto been

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linked together at par. The major consequence of the Moroccan decision is that exports to the Franc Zone are now 17.55 per cent more expensive, and this is bound to affect mineral exports, a large proportion of which have been imported until now by the Franc Zone on a preferential basis.

Although the Moroccan franc is obviously weakening, having fallen to 485 to the \$ U.S. on the Tangier free money market, for example, the Minister of Economy, Abderrahim Bouabid, had insisted on several occasions last month that it will not be devalued. The prejudice to Moroccan trade with the Franc Zone, Mr. Bouabid says, will be compensated for by a shift of trade to countries outside the Franc Zone, notably to countries of the Soviet bloc and to the Middle and Far East.

So far, at least, Moroccan phosphates have not suffered from the new disparity between French and Moroccan currencies. A new record for exports was attained last year with 6,332,547 tons, and in January this year exports appeared to be even better with just over 600,000 tons exported compared with 510,000 in January, 1957. According to Mr. M'Hamed Zeghari, the new Moroccan director of the Société Chérifienne des Phosphates (a State monopoly), exports this year will total 7,500,000 tons, or over 2,000,000 tons more than in 1957. Production at the Khouribga and Louis Gentil mines in 1958 amounted to 6,335,822 tons, or almost exactly the same as the export figure, compared with 5,567,519 tons in 1957.

The following minerals registered production gains in 1958 compared with the previous year :

Mineral	1958 (tons)	1957 (tons)
Lead ore ...	136,936	128,464
Iron pyrites	18,450	6,260
Cobalt ore	9,259	4,230
Copper ore	3,874	2,138
Barytes	42,692	14,765

And the following minerals suffered production falls:

Mineral	1958 (tons)	1957 (tons)
Anthracite	509,999	520,999
Zinc ore	86,771	88,873
Manganese (metal)	353,661	415,099
Manganese (chemical)	56,424	77,053
Iron ore ...	1,538,426	1,868,122

The table shows fairly substantial declines in iron ore and in manganese. Exports of the former totalled 1,330,254 tons last year, whilst exports of all grades of manganese were less than 340,000 tons. There is still no firm news of the plan to build a steel industry in northern Morocco, using anthracite from Jerada and iron ore from the Spanish mines at Nador.

Latest reports from our correspondent in Morocco indicate that export taxes on lead, zinc, manganese, and cobalt ores are to be reduced from 5 per cent to $\frac{1}{2}$ per cent, according to officials in Rabat, and import concessions to the mining industry in the form of cheaper electric power, coal, and other fuels, are to be made also. In addition, certain imported products used in the concentration of ores will be granted reductions in import duties, according to the same source.

These measures, which are designed to compensate for difficulties which may be encountered by Moroccan minerals in world markets because of the new monetary status of Morocco, will be published shortly in the form of an official decree. Officials say each case will be judged on its individual merits, and applications for the special benefits must be sent to the Ministry of Economy (Industry and Mines Department).

THE COPPER FLOWER AIDS PROSPECTING

Of particular interest in the initial issue of *Horizon*, the new magazine of the Rhodesian Selection Trust group, was the first comprehensive account of *Ocimum Homblei de Wild*, the Rhodesian flower that indicates sub-outcropping copper ore. This is an outstanding example of botanical knowledge aiding the search for minerals.

According to *Horizon*, investigations into the general distribution of flowering plants known to grow on "copper clearings"—sparsely vegetated zones over near-surface copper ore—began in October, 1949. As a result of these investigations an indicator plant was found. Simultaneously, however, it was also established that a very similar, non-indicator plant existed.

Ocimum Homblei de Wild, the true copper flower, is of the *Labiateae* order. Calyx formation comprises a white, fluffy covering resembling fine, soft, carded wool and there are five petals, three lower- and two upper-jointed, with smooth tips. The flower is mauve at the petal tip fading to white at the base, with the flowering season August to mid-January. The leaves are non-serrated margins, though some have a suggestion of serrations at the tips, and are of smooth texture. The stem is of square shape.

The pseudo flower, *Becium Obovatum E. Mey.*, is of hairless calyx. Of its five petals, three are lower-jointed and two upper-jointed, the upper petals having ragged tips. In colour, this flower is mauve at the tips fading to white at the base, its leaves are serrated and of coarse texture, while its stem is of square shape. The pseudo plant is found on and off copper-bearing areas.

By 1954, observations had been made at thirty copper occurrences from near Lusaka to the border of the Belgian Congo. In all but two instances *Ocimum* was present, and in these two exceptions the soils over the mineralized formations were deeply leached and had a low copper content. Occasionally, small clumps of the flower have, in fact, been discovered some distance from orebodies. However, these occurrences are invariably along "dambo" edges and along the drainage into which copper has been brought by water from known orebodies. During the past nine years the occurrence of *Ocimum* in places where copper was not previously known has led to soil sampling, pitting and finally drilling, with successful results. The flower is now being mapped in both Northern and Southern Rhodesia.

Owing to the fact that, because of the leached nature of the ground, the flower may not be growing where copper exists, *Ocimum* may in no sense be regarded as a substitute for the standard geochemical methods of prospecting. Yet it is a sensitive copper indicator of "remarkable selectivity". Indeed, the more information collected the more did the "copper flower" theory increase in stature. During the investigations it was found that so faithfully did the flower follow the line of deposits that the flower charts were almost identical in outline with those of the underlying copper deposits.

Specimens found growing over Copperbelt orebodies were tested for copper at the Geochemical Prospecting Research Centre in London and also in the R.S.T. Services geochemical laboratory. As a result of these tests it has been established that the leaves of *Ocimum* may contain up to 2,500 parts per million Cu, whilst the thick, woody rhizome-type roots gave figures in at least two instances of 4,500 p.p.m. It is established, therefore, that the plant is a pronounced copper accumulator. Furthermore, laboratory experiment has demonstrated that its seeds would not germinate in culture solution unless 50 p.p.m. Cu were present. Optimum growth conditions are reached in solutions containing 600 p.p.m. Cu.

Base Minerals in Southern

THE gold industry of Southern Rhodesia has suffered as a result of world economic conditions and has lost its former importance. Its decline has been offset by the considerable demand for base metals and minerals, which has developed due to rapidly changing world conditions and the great expansion of industry. To keep pace with this demand, and to meet the increasing industrial development taking place within the Federation, it is necessary that a constant search for new mineral deposits be maintained, and that research be conducted towards the utilization of many deposits at present too low in grade to be worked economically. Since the development of a large-scale mine may take five years or more before production can commence, a long-term policy is very essential in the development of the mineral industry.

Southern Rhodesia's mineral resources are now attracting the attention of large mining companies from South Africa and overseas, and the latest methods of scientific prospecting are being used in efforts to locate new deposits. Occurrences suitable for large-scale exploitation are difficult to find, and many of the discoveries made prove too small for large company exploitation. These deposits are too big to be worked by small syndicates or individuals, and there appears to be scope for the formation of medium-sized companies to develop and mine them properly. A revival of the popularity of such companies with local investors would be of considerable help in furthering the mineral industry.

A New Handbook

A handbook entitled *Base Minerals in Southern Rhodesia*, compiled by R. B. Anderson, B.A., F.G.S. (Government Mining Engineer, Bulawayo) has been issued by the Department of Mines, Lands and Surveys, P.O. Box 8094, Causeway, Salisbury, Southern Rhodesia, as Southern Rhodesia Mines Department Bulletin No. 6. Its purpose

is to summarize, in convenient form, general information with regard to the various base metals and minerals used in industry which are found, or may be found, in workable quantities in the Colony.

The handbook draws attention to many low-grade deposits within Southern Rhodesia which have no immediate local significance, but which could prove of interest in the foreseeable future and might warrant some attention from a long-term standpoint.

Bauxite

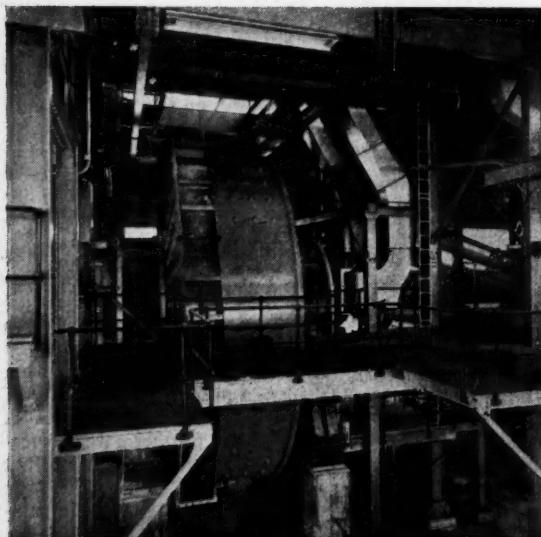
So far as is known, supplies of *bauxite*, the normal ore of aluminium, are very limited in the Colony, and no smelting industry could be established. With changing metallurgical techniques, however, and the availability of low-cost hydroelectric power, deposits of low-grade aluminium clays may be used in the future or the large deposits of nepheline-rich rocks of the upper Sabi valley may be developed as a source of the metal. At present, the value of any such deposits as may exist lies in their possible utilization for the production of aluminium chemicals suitable for water purification, the refining of petrol, paper-making, etc. They could also be important for the manufacture of aluminous abrasives and in the ceramic industry once this becomes more highly developed.

Aluminium-rich clays occur in the Selukwe area and bauxite is mined in Portuguese East Africa adjacent to the international boundary north of Penhalonga. There has been little incentive, so far, to search for bauxite and bauxitic clays, and it is possible that these may be more widespread than these two instances indicate.

Beryl and Chromite

Beryl, the only beryllium mineral at present of any importance, is of widespread occurrence in Southern Rhodesia, and the Colony is a major source of world supplies. Production commenced with the discovery of economic quantities of the mineral in the pegmatites of the Bikita tin fields in 1949. Since then interest in this form of mining has been maintained, due to many of the deposits being workable with a very small capital outlay.

In view of its importance as an alloy metal as well as its use in the atomic energy field, the demand for beryllium metal should increase. To meet this demand it will be necessary to find additional deposits and to improve mineral dressing practice. As supplies become more difficult, it is probable that prices will increase and deposits which are uneconomic at present will become important. Due to the widespread occurrence of beryl-bearing pegmatites in Southern Rhodesia, research into recovery methods would be justified and the research for new orebodies should be continued.



At left, alongside, the Aerofall mill recently installed at the Southern Rhodesian copper producer, Mangula Mine. A second Aerofall unit should be in commission at the Mangula property by March, 1959

Rhodesia

Southern Rhodesia's resources of metals and minerals are reviewed in a handbook issued by the Mines Department. Exploration, development, and market prospects are examined in the light of increasing industrial development in the Central African Federation.

African Federation.

Southern Rhodesia has very considerable deposits of chromium ores and has been for many years a major source of supply for the world markets. At present the trade is mainly based on exports, but with the increasing development of the Colony suitable supplies of electric power have become available and the manufacture of ferro-chrome has been commenced.

The view is expressed that the time has come when serious consideration must be given to the further manufacture of chrome products within the country. It is this aspect of the industry, rather than the finding of new deposits, which now warrants attention. With the increase in available electric power which will come with the completion of the Kariba scheme, further facilities for the production of ferro-chrome will be available. Since the establishment of such works involves a considerable time lag, such schemes can be considered now. The manufacture of chrome chemicals would also be of considerable importance and would assist the mines by stabilizing the trade in chemical grade ores.

Supplies of ore suitable for the manufacture of refractories are also available, and deposits of magnesite occur. There is thus considerable scope for investigation into the possible manufacture of chrome and chrome-magnesite refractories.

Iron Ore Resources

On the subject of iron, it is pointed out that Southern Rhodesia is a young country from the viewpoint of industrial development, and that its iron ore resources have not been fully investigated. Sufficient high-grade ore is known to meet internal requirements for some time, but if a broader outlook is taken, and the Colony is viewed in relation to world developments and requirements as well as to a rapidly developing Africa, it would seem that more attention to the investigation and development of iron ore resources may be justified. From this viewpoint, and taking into consideration lean ores as well as those of higher grade, then the Colony's outlook as a potential large-scale producer of iron and steel is very considerable.

Above, at right, a worker is seen removing a "book" of mica from a mine in the Miami area of Southern Rhodesia. There are possibilities of increasing markets for Rhodesian mica



and it is possible that the country could be developed into one of the world's leading producers. Many of the lean ores are of a type and grain size which should make their concentration less difficult than those of other fields.

Any further development of these iron ore resources must be a long-term policy. The eventual provision of adequate electric power from the Kariba scheme could be an influencing factor.

Lithium

Southern Rhodesia is a major producer of lithium minerals, which are of widespread occurrence in the Colony. The major producing field is at Bikita, some 50 miles east of Fort Victoria, where the minerals occur in a very large pegmatite dike some 2,000 yds. long and some 300 ft. wide. The southern end of this pegmatite is being worked principally for lepidolite; at the northern end, on the Al Hayat claims, a remarkable mass of petalite some 500 yds. long and from 100 to 200 ft. wide occurs.

Possibilities for the future development in the Colony of industries based on the use of lithium ores and chemicals appear good and warrant further investigation. Recently the manufacture of lithium salts was commenced in Southern Rhodesia on a small scale, and this industry is now expanding. There is also scope for research into the beneficiation of low-grade ores, or the establishment of any industries which could utilize such material.

Deposits of lithium minerals of commercial grade are not over-plentiful, and this, together with the possible growing demand for lithium chemicals, makes it necessary to develop and utilize the Colony's resources to the best advantage. To this end it is essential that all possible lithium deposits be investigated.

Other Minerals

Manganese is essential to the further development of the steel industry in Southern Rhodesia, and deposits of manganese minerals and of manganeseiferous iron ores are important. Known deposits are small, but larger deposits may still be found, particularly in association with iron ores.

Platinum is known to be associated with small quantities of nickel and copper in certain platiniferous zones in the

Great Dyke. The potential reserves of such material are very large; these are low in grade, but further research into methods whereby they might be utilized would appear to be amply warranted. There is considered to be a reasonable chance of establishing platinum mining, despite the general lack of interest which has been shown in prospecting for these metals during the past twenty-five years.

Owing to political developments in other parts of the world, more attention is now being paid to Southern Rhodesia's cassiterite deposits, which are now being actively explored and developed. The Colony's production is at present small, but may show marked expansion if the western section of the Kamativi field comes to be actively developed. The discovery of further economic tin deposits would be important, and there is scope for further prospecting. In particular, such deposits may be sought in the Marula-Plumtree area, in the northern part of the Sebungwe district, on the Portuguese border north of Inyanga, and in the granite areas of the Zambezi valley east of the Sanyati River. The possible occurrence of tin with copper deposits should not be overlooked.

No workable deposits of uranium and thorium minerals have so far been discovered in Southern Rhodesia, but the possibility that they may be found is borne out by the fact that an office has been opened by the U.K. Atomic Energy Authority at Salisbury to carry out surveys in the Federation and to give advice and assistance to anyone interested in prospecting for radioactive minerals.

Cinnabar has not been prospected for extensively in Southern Rhodesia, and there appear to be good possibilities that deposits at least capable of meeting local demands might be found. In the Bubi area north of Bulawayo, the work done indicates that the deposits conform to types which have proved workable elsewhere.

In the Wankie Colliery area of Southern Rhodesia, radioactive finds have promoted intensive prospecting. Thorium, in association with barytes, and uranium, in association with fluorspar, have been identified. The new mineral field is approximately 4,000 sq. miles in extent

Asbestos

Asbestos is now the leading mineral, in value of output, produced in Southern Rhodesia. The industry is an old-established one which has not, as yet, been developed to produce the full range of fibre grades possible, outputs being confined almost solely to asbestos-cement grades and spinning fibres. The reason for this lack of full development lies in the geographical situation of the country relative to markets and in high transport costs.

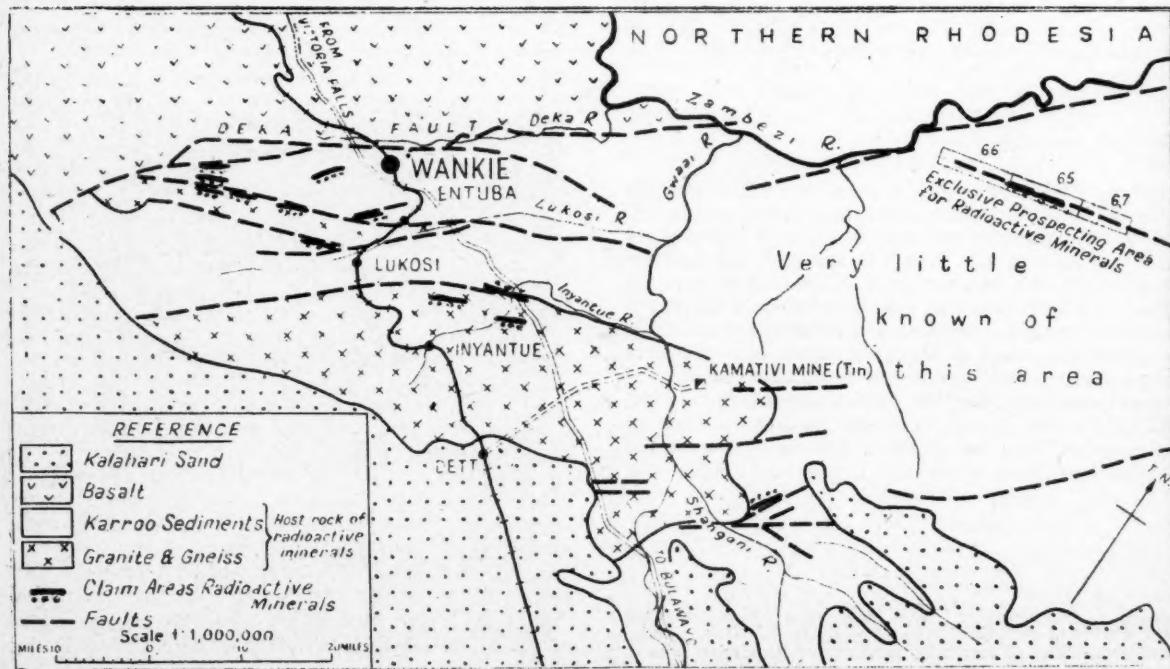
It is considered probable that further deposits of asbestos will be found in Southern Rhodesia, but it is likely that most of these will be valuable only as a source of the shorter grades. The immediate future development lies in the use being made of the shorter fibres, which at present in general constitute a waste product. These may be developed either in the form of an export commodity or as a raw material for utilization in industry within the Colony.

There are ample resources of asbestos of all grades to meet the requirements of any industry based on the use of this raw material which might be established in the Colony.

Mica

In discussing the Colony's mica resources, it is pointed out that Central Africa is developing rapidly, particularly with regard to increased supplies of electrical power; consequently the use of equipment containing mica as a component part must also increase. As this comes about, so the domestic market will increase with the possibility that secondary industries based on the use of mica may be established.

Information is given regarding Southern Rhodesia's resources of many other metals and minerals and their potentialities for future development. It is considered that large areas exist which can provide extensive scope for the modern forms of mineral exploration, and that certain sections of the Colony at present considered to have little mineral future may yet be shown to contain mineral wealth of considerable economic importance.



Sponge Iron Production

By J. Grindrod

MAKING it possible, for the first time, to build up a steel industry using iron ore and either natural gas or petroleum, and without the need for coal or limestone, which are major raw materials in the conventional blast furnace, a new process has been developed for converting iron ore into sponge iron in Mexico. Known as the Hyl process, the method of direct iron ore reduction is claimed to have opened the door to the economical production of steel in many parts of the world now unable to establish a steel industry. The process is also said to offer non-integrated specialty steel producers a means of integrating steel production facilities without resort to a blast furnace.

Developed by Hojalata y Lamina S.A., one of Mexico's principal steel producers, with engineering assistance from the M. W. Kellogg Company of New York, this sponge iron process is claimed to have been proved highly practical for commercial steel production in a 200 tons per day plant at Monterrey, Mexico, owned and operated by Fierro Esponja S.A., an affiliate of Hojalata y Lamina. The M. W. Kellogg Company, a subsidiary of Pullman Inc., has been appointed exclusive sales and licensing agent for the process.

Theoretically possible for many years, the production of sponge iron using hydrocarbons has now been practised for several months with natural gas, and Fierro Esponja S.A. has recently awarded a contract to the M. W. Kellogg Company for a second plant which will produce 500 tons of sponge iron per day.

Present centres of steel production have grown up in areas with abundant supplies of iron ores and suitable coking coals for ore reduction. Three factors have hindered development of a steel industry in many countries richly endowed with high-quality iron ores. These are the lack of abundant coking coals; the often prohibitive cost of operating a basic steel industry dependent on imported raw materials; and the economics of blast furnace operation, which require production rates generally far beyond the consumption requirements of some nations and many specialty steel producers. A further factor is the considerable investment essential for a blast furnace of even minimum size.

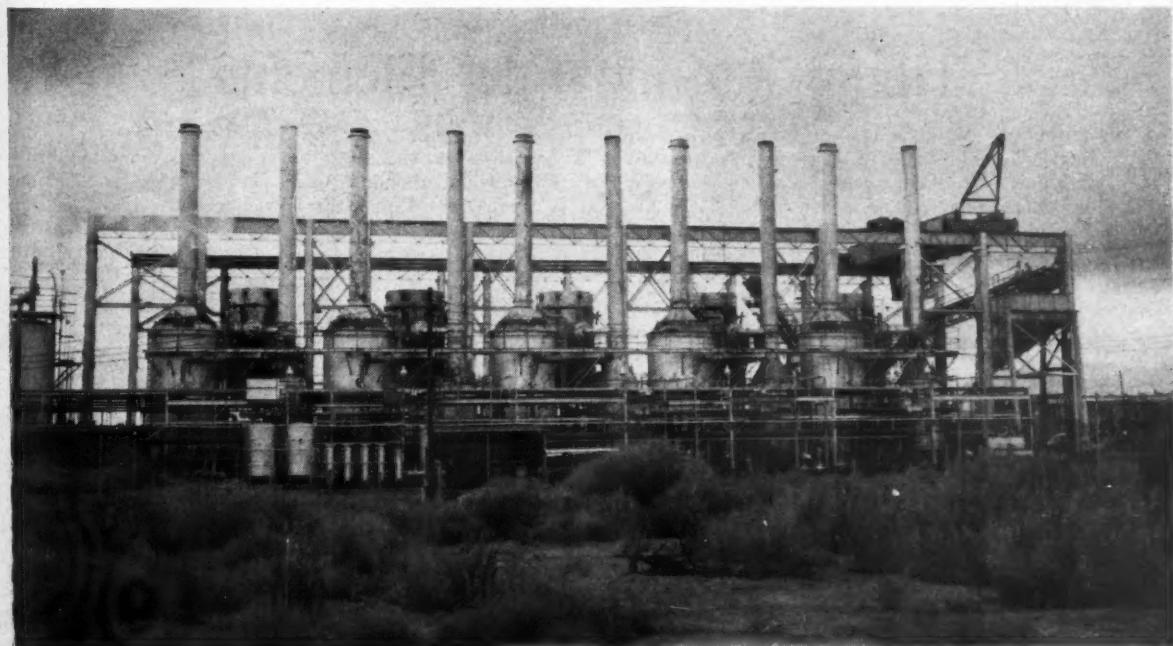
It is claimed that, with the Hyl process, plants can be engineered to meet a wider variety of melting furnace charge requirements and can be constructed at a cost considerably below the investment necessary for a minimum size blast furnace.

At the Monterrey plant of Fierro Esponja, Durango haematite ore is reduced in fixed-bed batch-type reactors by direct gaseous reduction. The reducing gas, approximately 85 per cent hydrogen and carbon monoxide and the remainder carbon dioxide, methane, and water vapour, is obtained from natural gas, the latter being first desulphurized and then passed through a Kellogg high-pressure steam-reforming furnace.

Five reactors are used, and the reaction cycle requires four hours, with an additional 30 minutes for dumping and charging. The reduction process for all the reactors is controlled from a central control house and reactor dumping is controlled from an outdoor platform. At any moment each reactor is at a different stage in the process cycle, making it possible for one labour crew to operate all the reactors. One reactor is dumped each hour.

In operation, ore ranging in size from $\frac{1}{2}$ to $1\frac{1}{2}$ in. is charged to the reducing reactors. Average ore analysis, in weight per cent, is insoluble 4.500, Fe 66.600, CaO 0.000,

The five reactors at the 200 tons-per-day plant at Monterrey in which iron ore is reduced to sponge iron



P 0.008, S 0.020. In the 200-ton-per-day plant, each reactor holds about 30,000 lb. of ore and about 21,000 SCF of natural gas is required per ton of reduced ore. The reducing gas re-formed from natural gas is used under conditions of maximum thermal efficiency.

Final ore reduction takes place within a temperature range of 1,600 deg. to 1,900 deg. F. The reduced product retains the approximate size of the charged ore, but becomes porous. The hot sponge iron is discharged from a reactor to a hopper for transportation to a melting furnace, its average percentage analysis being metallic iron 86.000, total iron 90.000, per cent reduction 95.550, carbon (which can be increased to 2 per cent) 0.620, sulphur 0.070, insoluble 8.000.

Used as an electric melting furnace charge in place of pig iron or scrap, the sponge iron is said to produce a steel of exceptionally high quality. Finished as sheets, it is used for such difficult deep draw applications as for cooking utensils. In another application, the steel is used for high-quality electric resistance welded pipe.

The 500-ton-per-day plant to be installed at Monterrey will have substantially lower utilities requirements, improved thermal efficiency, and improved operating economics. Improvements in the mechanics of operation to greatly simplify materials handling will also be incorporated. The reducing gas will have the same composition and five re-forming furnaces will be installed to supply the reducing gas for the new plant.

Actual reduction of the iron ore will be performed in four reactors, each holding approximately 105 tons of ore. The plant will be engineered so that the heat content of the re-formed gas and the reduced ore is completely utilized. To achieve this unusually high thermal efficiency, the sponge iron is cooled after reduction, and this achieves another saving by eliminating the need for special equipment and procedures to handle metals at high temperatures. When discharged, the sponge iron can be sent either direct to the electric furnaces or to storage for later shipment to the steel plants. Experience has shown that reoxidation of the sponge iron is no problem.

Operation of the new plant will be from a central control house equipped with a large graphic panel instrument board similar to those used by many petroleum refineries. The graphic panel board diagrams the complete process

and contains a system of lights and other instruments to monitor and control the process at all stages.

Estimated operating costs for a 500-ton-per-day Hyl sponge iron plant, based on a Gulf Coast site, are as follows:

ESTIMATED OPERATING COST FOR 500 T/D HYL SPONGE IRON PLANT

Item	Quantities/ Ton Fe*	Price (Gulf Coast area)	Cost/Ton Fe*
Natural Gas	16,900 Scf	0.158/Mcf	2.67
Cooling Water	12,400 gal.	0.0086/M gal.	0.11
Boiler Feed Water	2,210 lb.	0.04/M lb.	0.09
Power	10.5 kWh.	0.006/kWh.	0.06
Excess Steam Produced	140 lb.	0.265/M lb.	0.37
Total Utilities			2.56
Catalyst Make-up	0.15 lb.	1.50/lb.	0.23
Operating Labour	7 men/shift	3.30/hr.	1.11
Supervision	1 man/shift	5.00/hr.	0.24
Total Labour			1.35
Maintenance	3% of Plant Cost†		0.99
Total Direct Cost			5.13
Indirect Cost	50% of Total Labour		0.68
Production Cost			5.81
Capital Charges	12% of Plant Cost†		3.96
Total Processing Cost			9.77

* One ton Fe corresponds to 2,240 lb.

† The capital investment in \$/annual ton iron (based on Gulf Coast site) equals 30.

Far larger plants than the 500-ton-per-day plant ordered by Fierro Esponja are considered practical. Ores with a high percentage of fines, and therefore difficult to handle in normal blast furnace operations, may be reduced to metallic iron and, by this addition of the briquetting operation, sold as high-quality metallic feed. Areas now exporting ores may, with suitable melting and mill installations, convert their natural resources into steel with a considerable improvement in income.

Arrangements can be made through Kellogg's for both pilot plant processing of ore samples and, where desired, the processing of car-load lots of ores on a commercial scale at Monterrey.

Tin in Atomic

TWO of the prototype power plants now being tested in the United States employ tin as an alloying element in their nuclear reactors, states W. Chubb, of the Battelle Memorial Institute, Columbus, Ohio, in *Tin and Its Uses*. Tin is used in the form of an alloy of zirconium, which is required as a structural material in the reactor cores.

One of these reactors, called an Experimental Boiling Water Reactor, went into operation in February, 1957, at the Argonne National Laboratory, near Chicago, Illinois. A boiling water reactor operates in many respects like a conventional fire-tube steam boiler. Steam forms around the outside of the fire-tubes in the conventional steam boiler and around the outside of the fuel elements in the nuclear reactor. The only difference is that the fuel element in the nuclear reactor is solid metal, either metallic uranium or a uranium alloy, encased in a corrosion resistant covering or cladding.

The Pressurized Water Reactor built at Shippingport, Pa., maintains the water in the reactor core under high pressure. No steam is produced in the nuclear reactor

Fuel Elements

itself. The hot water produced in the reactor is fed through a heat exchanger, where steam is generated on the low-pressure, secondary side. Because this heat exchanger is located some distance from the nuclear reactor, the steam produced on the secondary side is not radioactive and is used to operate a conventional 60,000 kW. steam turbine.

Both of these reactors employ plate-type fuel elements, and it is here that tin plays its vital role. Research teams have found that additions of small amounts of tin not only strengthened zirconium, but also reduced the variable effect of impurities and had a favourable effect on corrosion resistance.

This discovery was the basis for the development of the "Zircalloys", a family of alloys of zirconium containing from 0.5 per cent to 5 per cent tin.

While consumption of tin in "Zircalloys" is probably no more than a few hundred pounds annually, the rate of tin consumption for new power reactors will increase appreciably if this type of water-cooled reactor proves successful.

Machinery and Equipment

Diesel Engines for the Export Drive

Expressing the hope that their two latest diesel engines may well take a lead in recapturing Britain's world markets in the face of international competition, Davey, Paxman and Co. Ltd. showed the Vega and Ventura units to the Technical Press on Tuesday last week.

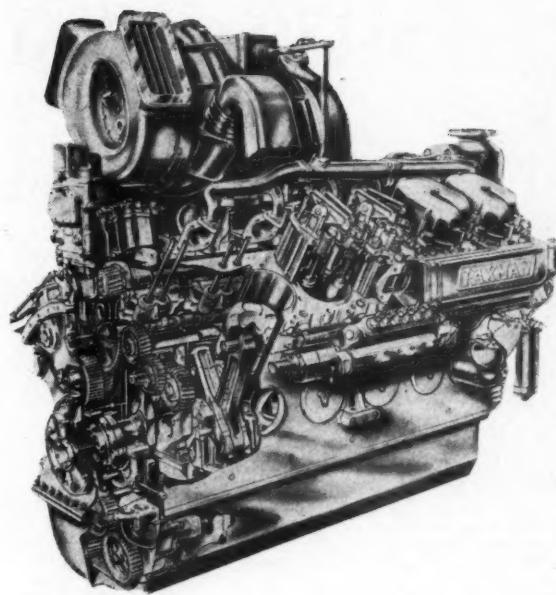
The Vega, an air-cooled diesel, is in the power range 160 to 466 b.h.p. at speeds of up to 2,100 r.p.m., and is manufactured in vee formation. The power-weight ratio is of the order of 10 lb./b.h.p. Applications in mining include use with air compressors, for air drilling or general services, in generating sets for lighting, for tractors and earth-moving equipment, off-the-highway vehicles, and shunting locomotives. There are wide applications in oilfield operations.

For approximately the last decade, air cooling has been increasingly used on small engines, and has been introduced progressively on engines of higher powers. Some five years ago, Paxman's began investigations into the feasibility of producing a large air-cooled engine design at powers around 300 to 400 h.p. This led to the introduction of the Vega range, consisting of the 8YGA and 12YGA models. With its introduction, the Ruston-Paxman air-cooled engine range now extends from 6 to 450 h.p.

Ventura engines (in excess of 1,000 b.h.p.) are offered in a power range from 1,100 to 1,735 b.h.p. The significant factor is that, in the case of the 12-cylinder engine, its dimensions are no greater than the 12 RPH engine in the Paxman 7 in. bore range, and its specific weight is reduced by some 60 per cent.

The Ventura, a 60 deg. vee-type water-cooled diesel, finds application in the driving of mud pumps in excess of 1,000

Alongside, at right, a cut-away view of the Ventura diesel engine manufactured by Davey, Paxman and Co. Ltd. Below, at left, the coupling arrangement for Ruston tandem locomotives



h.p. input, in electric generating sets, emergency lighting units, pipeline boosting stations, and in generating sets for offshore drilling platforms and barges. The Ventura range consists of the 12-cylinder pressure-charged (12YJX) and intercooled (12YJC), and the 16-cylinder pressure-charged (16YJX) and intercooled (16YJC) engines.

There is an increasing role throughout the world today for power units in the 1,000 to 2,000 h.p. range, having particularly small dimensions and high power-weight ratio. With this in mind, the Ventura has been developed as an addition to the Paxman RPH-YHX range.

Sales of both the Vega and Ventura will be completed through the usual channels employed by the manufacturers.

SHUNTING IN TANDEM

Advantages in the use of multiple coupled locomotives for mainline haulage duties have been proved for a number of years, and these same advantages can be applied to the use of tandem machines for certain shunting duties. This tandem plan cannot be justified for all duties, any more than the use of multiple locomotives can be justified on all main lines, but in many applications the tandem plan of Ruston and Hornsby Ltd. will prove a solution to complex shunting problems.

For example, a number of collieries or quarries may feed to a central screening or processing plant, with each feeder requiring 150 or 200 h.p. However, the final plant output may have to be hauled to the main line either in larger trains or over more adverse gradients requiring 300 or even 400 h.p. This is an instance where the tandem plan would show a definite cost and flexibility advantage over other schemes involving a "mixed bag" of machines.

In the normal diesel electric locomotives, reversing is performed mechanically, and this is not possible with the tandem locomotives. It is, therefore, necessary for air pressure to be used to throw reverser switches; the control

being arranged through electro-pneumatic valves.

A multi-core cable is used between the two locomotives with multi-pole sockets.

The brake control valve incorporates a special feature, as for train braking, which on application releases a graduated and equal pressure to the brake cylinders on each machine; thus giving an even degree of application to each wheel of the tandem unit. To hand over the brake control from one locomotive to the other, it is necessary to drop a catch on the brake valve and lift the operating lever to the handle-off position, which is above the normal release position.

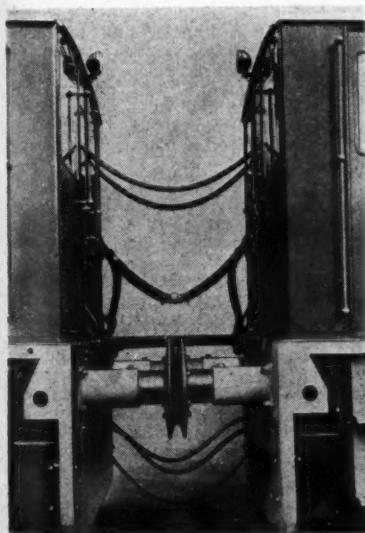
Sanding is arranged in the usual way with air ejection from the sand boxes and with a second ejector in the lower portion of the sand pipe. Control, however, is by electro-pneumatic valves operated by press-buttons which are arranged at either side of the cab. The electric controls are connected through the multi-core jumper cable between the two locomotives.

It will be seen from the above that air pressure is used on a number of controls and to ensure the simultaneous operation of these on the two machines, pressures must be similar. Therefore, an air pressure balancing pipe is used between the two units which ensures that unloading and loading of compressors occurs simultaneously and that an equal working pressure is available on both machines.

NEW LIGHTWEIGHT SUPPORT LEG

A new lightweight support leg for use in conjunction with their range of rock drills has been introduced by the Consolidated Pneumatic Tool Co. Ltd. This unit, which is alternative to the standard range of steel airlegs, has a weight of 32 lb. and is fabricated from Dural. Specifications include a stroke of 4 ft., a bore of 2½ in., and an overall length when closed of 5 ft. 10 in. The length when fully extended is 10 ft. 1 in.

The new unit represents a weight saving of 26½ lb., as compared with the equivalent steel version.



MINING MISCELLANY

The article "Modern Techniques in Geological Survey in Southern Rhodesia" which appeared in our issue of February 6, 1959, was published by permission of the Director of the Geological Survey, Southern Rhodesia. We regret the omission of this acknowledgement.

*
A report relayed from Samarkand by the official Russian news agency Tass states that geologists have discovered three large goldfields in Central Uzbekistan. Development of the fields is to be undertaken by the Russian Government in the next two years.

*
New deposits of lignite are reported to have been found north-west of Grinsted in North Jutland.

*
A three-man Egyptian delegation has gone to West Germany to study enrichment processes for domestic manganese ore.

*
The Abbeytown Lead and Zinc Mines at Ballisodare, County Sligo, have been re-opened. They were closed down last March because of the fall in world metal prices.

*
Preparatory work for the exploitation of the copper ore deposit found two years ago in the Glogow area of Polish Silesia has been completed. Although no figures are available, the deposit is understood to be among the richest in the world. Exploitation will require a large amount of capital and it is reported that both technical and financial help will be forthcoming from the U.S.S.R.

*
New industrial projects in Argentina, involving at least \$23,000,000, are being considered by the Kaiser Industries Corporation. They include a \$15,000,000 aluminium reduction plant of 20,000 tons annual capacity.

*
Miners in the Sokolov coalfield of West Bohemia, Czechoslovakia, mined their first million tons of coal this year by the end of January. In 1945, they needed almost four months to achieve the same results. The increase is due to the extension of mechanized working at the pits concerned, which are opencast operations. Other news from Czechoslovakia is that new mines are being established in North-West Slovakia for the extraction of high-grade brown coal. The calorific value of this coal is stated to be up to 4,000 cal., and production will start in 1962.

*
The Minister of Mines and Petroleum, Colombia, has sought congressional approval for the establishment of a mixed company, with Colombian and foreign capital, which would have a monopoly of the country's trade in emeralds in the world market.

*
Cassiar Asbestos Corporation, in which Turner and Newall have a substantial holding, is among the companies involved in a staking rush at Telegraph Creek, in Northern British Columbia. Other companies operating in the area include Phelps Dodge of Canada, and Kennecott Copper, through its sub-

diary, North-Western Exploration. It is understood that Cassiar, as the first-comer into the area, has staked more ground on the asbestos showings than its competitors.

*
As a counterpart for Czechoslovakia's technical help in developing Albania's mining industry, the latter country is to export large quantities of nickel-iron ore to Czechoslovakia. It is understood that the Witkowitz iron and steel plant has been equipped with a comparatively small facility to treat these ores and produce nickel carbonate. Meanwhile, experience gained in the operation of this pilot plant will be used to design a full-scale plant.

*
Four million dollars will be spent in 1959 to build an addition to Erie Mining Co.'s taconite plant at Hoyt Lakes, Minnesota. The addition will house two pelletizing furnaces of a new type, which will be used in experiments to improve pelletizing processes.

*
One of the biggest single lengths of conveyor belting ever built by the Goodyear Tyre and Rubber Co. (Gt. Britain) Ltd. was recently completed at the company's Wolverhampton plant. Constructed in 32-oz. cotton duck, this 42 in. x 8-ply Goodyear Stacker belt, with a top cover of 4 in. and a bottom cover of 3/32 in., runs to a length of 1,350 ft. Weighing approximately 11 tons, it has a maximum plant diameter of 11 ft. A Leno breaker was included in the construction of the top cover to prevent gouging, cover stripping and loading impact cuts. The belt was ordered by Guest, Keen and Nettlefold Ltd., of Eastmore Works, Cardiff, for carrying iron ore. The photograph shows the belt ready to be lifted from the A-frame prior to trimming and final inspection



*
On September 25-27 and December 11-12, 1957, in anticipation of the Clean Air Act, 1956, and the Rivers (Prevention of Pollution) Act, 1951, coming into full effect in June and August, 1958, respectively, the Iron and Steel Engineers Group of the Iron and Steel Institute held two meetings on air and water pollution in the iron and steel industry. Twenty-five papers, written especially for the meetings, were presented and discussed. The proceedings have been published in one volume as No. 61 in the Institute's Special Report series. The cost to both members and non-members is £4 5s.

*
A report from New York states that Koppers Co. Inc. has a letter of intent from a group of Canadian companies for a steel-making plant using the Strategic-Udy process. This process was developed to convert many different grades and types of iron ores into semi-refined steel, bypassing the blast furnace, coke oven, and open-hearth furnace. The identity of the Canadian group has not been disclosed. Negotiations on another project using the Strategic-Udy process are said to be well advanced.

*
Canada has agreed to provide India with \$17,000,000 worth of essential commodities and equipment to maintain that country's economic development programme. The allocation includes \$10,500,000 in raw materials such as aluminium, copper, and nickel.

*
A newly founded, publicly subscribed Canadian company named Andacollo Mining Co. Ltd. has taken over the operations of the Andacollo mine in Chile through purchase of Cia. Minera San Felipe. The mine is located near San Felipe and its ore is being custom-processed and upgraded to 50 per cent Cu and some gold and silver values. Ore reserves are placed at not more than 1,000,000 tons, but the grade—4 to 5 per cent Cu and gold and silver values—as well as the favourable location, compensate for the relatively small tonnage. Additional ground is being acquired. The president of the company is Mr. Howard Steven Strouth, founder and for four years president and general manager of Stanleigh Uranium Mines. Mr. J. M. Cunningham-Dunlop, an officer and director of Ventures, Hoyle, New Calumet *et al.*, is vice-president. First shipments are expected in February or March.

*
Ice breakers were standing by in Sweden to force a passage through the canals to Lake Vanern for the 300-ton Dutch coaster M.V. *Condor*, which sailed from Ipswich with a Rapier 150 walking dragline excavator. Weighing 190 tons and carrying a 5 cu. yd. dragline bucket on a 132 ft. long boom, the machine was manufactured by Ransomes and Rapier Ltd. to the order of Svenska Skifferolje AB, a Swedish Government sponsored concern operation in the shale oil industry. The dragline will be used for digging a series of drainage canals and for excavating shale.

*
In the annual report of the Canadian company, New Hosco Mines, Mr. R. B.

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Graham, consulting geologist, states that sufficient ore has been outlined at the company's Mattagami area property to warrant underground development. The preliminary estimate places ore at 1,600,000 tons grading 2.53 per cent copper, plus a possible 168,800 tons grading 2.17 per cent copper. The estimate also includes 716,000 tons grading 8.23 per cent zinc.

★

The shipment of 618 tons of copper cement, valued at £125,000, from the Timna copper works in the Negev has inaugurated a new chapter in Israel's industrial history. In fact, this was the first commercial export of copper from Israel since the days of King Solomon. The purchase was made by a German refining firm. Israel's new budget will provide £2,500,000 (about £500,000 sterling) for the Timna copper works, mainly to be used for running-in expenses. Production started in October, 1958, with a planned output of 9,000 tons of copper cement annually. Negotiations for the sale of this year's total production are nearing their final stages.

★

In the course of the new budgetary year, the Potash Company in the Negev will be granted a further £4,000,000 (£800,000 sterling) credit, which will assist it to attain an annual production of 35,000 tons. This grant is part of a total sum of £16,500,000 (approximately £3,300,000 sterling) to be spent during the 1956-60 period on the exploitation of natural resources for the extension of raw materials reserves. After this expansion, the plant will be in a position to yield a profit.

★

A new discovery of rare earth minerals has been reported from Nevada. The find was made some time ago and shows 9 lb. lithium, 5 lb. cerium, and 3 lb. lanthanum per ton. Several large corporations are reported to be interested.

PERSONAL

Major General W. W. Richards has resigned from the board of Ex-Lands Nigeria Ltd. Mr. Cyril Joseph Burns has been elected a director.

★

Sir Alexander Killick, secretary of the Royal Institution of Chartered Surveyors, has been appointed a member of the Mining Qualifications Board in succession to Mr. J. D. Morton.

★

Sir Eric Gore Browne has resigned as a director of the Rio Tinto Co. Ltd. Mr. Victor Frederic William Cavendish-Bentick and Sir Percivale Liesching have been appointed directors.

★

Lord Bridgeman, chairman of Atlas Copco (Great Britain) Ltd., left London Airport on February 9 for a five-week business visit to Africa. During March, he will attend an Atlas Copco Conference in Johannesburg. Lord Bridgeman is a director of the South African and Rhodesian Copco companies.

★

Sir Stanley J. Harley has been appointed president of the Gauge and Tool Makers' Association for the year 1959, in succession to Mr. F. W. Halliwell. The vice-presidents are Mr. A. L. Dennis, Mr. H. S. Holden, Mr. T. Ratcliffe, and Mr. L. E. van Mopps. The chairman is Mr. G. P. Barrott and the vice-chairmen are Mr. R. Kirchner and Mr. H. G. Carmichael Wilson. The hon. treasurer is Mr. J. C. Brown.

Coming Events

First meeting of the Irish Mining and Quarrying Society will be held on February 20 at 7.30 p.m. in the Shelbourne Hotel, Dublin. The objects of the society are to disseminate scientific knowledge and technical information in connection with the mining and quarrying industries. The provisional committee set up at a previous meeting will put forward proposals regarding aims, status, and rules. The officers will be elected at the meeting. Mr. Tonner, 9 Wynberg Park, Blackrock (Co. Dublin), is for the time being acting as secretary of the society.

★

General meetings of the Institution of Mining and Metallurgy in the session 1958-59 will be held at the Geological Society of London, Burlington House, Piccadilly, W.1, at 5 p.m. on the following dates: February 19, March 19, April 16, May 21 (A.G.M. from 4 p.m.)

★

Hotel reservations are now being made for the 1959 Coal Show, which is being held by the American Mining Congress at Cleveland, Ohio, from May 11 to 14. Applications should be made to Louise D. Perkins, Director, Hotel Reservation Bureau, 511 Terminal Tower, Cleveland 13, Ohio.

★

The Institution of Mining and Metallurgy proposes to make grants in 1959 from the Bosworth Smith Trust Fund to assist postgraduate research in metalliferous mining (excluding mineral dressing, but including surveying and geo-physical prospecting). Applicants are asked to write for a form of application to the Secretary, the Institution of Mining and Metallurgy, 44 Portland Place, London, W.1, before February 28, 1959.

★

The British Trade Fair, Lisbon, 1959, takes place in the year of inception of the Portuguese Six-Year Development Plan, which will involve an expenditure by the Portuguese Government of £375,000,000 in Portugal and her overseas territories. The fair will be held at the new Exhibition centre of the Feira Industrial Portuguesa on the Avenida da India from May 29 to June 14. The products of over 500 British firms will be on view. This event, which will be far and away the largest foreign trade fair ever held in Portugal, is being organized by British Overseas Fairs Ltd., on behalf of the Federation of British Industries.

★

The foreign trade organizations of the East German Republic intend to conclude at the Leipzig Spring Fair 1959 (March 1-10) trade deals with capitalist countries to the value of DM 700,000,000. Intended purchases include iron ore, rolling mill products, titaniferous ores, mica, crude phosphates, feldspar, graphite, mining equipment, etc.

★

A discussion on "The Pumping of Liquids of Unusual Viscosity, Volatility, or Solid or Gas Content" will be held by the Hydraulics Group, Institution of Mechanical Engineers, at its meeting on Tuesday, February 17, at 6 p.m.

★

Among 19 papers to be presented by British authors at the International Congress on Electro-Heat (to be held at Stresa, Italy, from May 25-29) is one entitled "Development of Electric Smelting in the British Commonwealth", by Dr. A. G. Robiette.

"Electronics — the Key to Automation" will be the theme of the Electrical Development Association's exhibit on Stand B.5 at the Electrical Engineers' Exhibition at Earls Court from March 17-21.

★

The following dates of forthcoming meetings have been announced by the Institution of Mining Engineers:

Manchester Geological and Mining Society: Wigan (Mining and Technical College), Thursday, March 12, 1959, at 3.15 p.m., "Progressive development of mining machinery through usage underground," by A. York Saville.

The Midland Counties Institution of Engineers: Mansfield Woodhouse (Mines Rescue Station), Wednesday, February 18, 1959, at 4.30 p.m., "The use of models in the prediction of mine airway resistance," by J. D. Jones and Professor F. B. Hinsley; Ashby-de-la-Zouch (Mines Rescue Station), Wednesday, March 18, 1959, at 4.30 p.m., "The development of the Midget Miner at New Lount colliery," by L. J. Mills.

The Midland Institute of Mining Engineers: Sheffield (Royal Victoria Hotel), Thursday, March 5, 1959, at 2.30 p.m., "The efficiency of large and small collieries," by J. E. Longden and N. E. Webster; Doncaster (Danum Hotel), Thursday, April 2, 1959, at 2.30 p.m., "Control techniques in the production of commercial grades of coal," by H. C. Hoyle and A. E. Whittle.

The Mining Institute of Scotland: Edinburgh (Mining Laboratories, 79 Grassmarket), Wednesday, February 18, 1959, at 5.15 p.m., "The installation and operation of rapid ploughs in the East Fife area," by C. S. Taylor.

The North of England Institute of Mining and Mechanical Engineers: Newcastle upon Tyne (The Institute, Neville Hall), Thursday, April 2, 1959, at 2.30 p.m., "Coal preparation," by H. MacPherson, R. W. Booth, and F. F. Ridley.

The North Staffordshire Institute of Mining Engineers: Stoke-on-Trent (North Staffs. Technical College), Monday, March 2, 1959, at 5.30 p.m., "Modern shaft work, with reference to recent practice in North Staffordshire," by T. Walker; Stoke-on-Trent (North Staffs. Technical College), Monday, April 6, 1959, at 5.30 p.m., "Ground movements in the North Staffordshire coalfield," by H. Ogden and R. J. Orchard.

The South Staffordshire and Warwickshire Institute of Mining Engineers: Chadsmoor (Coniston Hall), Monday, March 9, 1959, at 6.30 p.m., "Red measures of the Midlands coalfield," by R. H. Hoare; Tamworth (Castle Hotel), Tuesday, April 21, 1959, at 6.30 p.m., "The installation of a plate-belt conveyor," by R. A. Bentley and A. Robinson.

The South Wales Institute of Engineers: Cardiff (The Institute, Park Place), Thursday, February 19, 1959, at 6 p.m., "Trees, pulp and paper," a talk by Dr. Theodore H. Frankel; Cardiff (The Institute, Park Place), Thursday, March 19, 1959, at 6 p.m., "The electrical aspects of the Continuous Miner at Trelewis drift mine," by H. Pritchard.

The Southern Counties Institute of Mining Engineers: London (3 Grosvenor Crescent, S.W.1), Friday, March 13, 1959, at 3.30 p.m., "Present advances in the drainage and utilization of firedamp," by J. G. Bromilow.

Metals and Minerals

Prospects for the Non-Ferrous Metals

Present prices of the metals are "low", rather than "high", states the British Metal Corporation Ltd., in its "Review of Non-Ferrous Metals in 1958". On the reckoning that consumption makes headway in 1959, base metal producers can reasonably look forward to firm markets and to a more profitable year than they had in 1958.

In regard to copper, the review states that in 1959, if world production were to be free of strikes and to run at capacity, it would amount to as much as 3,800,000 tons and would exceed the 1958 level of consumption by 400,000 tons. Thus, much depends on the way consumption shapes in 1959 and this, in turn, may chiefly be decided in the U.S. On the promise of the better showing in the last quarter of 1958, American usage of copper in 1959 may well pick up between 150,000 and 250,000 tons and, on the higher extent of increase, it would just about regain the consumption rate of 1954 and 1955; it would still not represent a new high level. In other countries taken together, copper consumption has bounded up in recent years—in fact, by 1,000,000 tons in the last five years, 1954 to 1958—and it seems reasonable to anticipate that in 1959 it may grow by, at any rate, another 50,000 to 100,000 tons.

Such increases, in the U.S. and other countries combined, would not absorb all the extra copper output on a full-out

basis but they would go most of the way towards doing so. In practice, however, what with strikes and other possible upsets, it is most unlikely that output of copper the world over can run at top rate for a whole year; it seldom, or never, does. So, despite the stepping up of capacity in the last few years, there may not be much, if any, surplus of actual production in 1959. One can visualize that the position might even grow a little tight.

In the section dealing with lead, it is recalled that the short-term response of the London market to the U.S. import quotas was to rise along with the New York market. The "first come, first served" mechanics of the administration of the quotas caused a rush to ship to, and thus to get early in, the national queues for the American market and it was evident that, because of the higher U.S. prices, this would be profitable even if entry of the metal were held up for a few months. But a halt must come to the locking up of stocks awaiting entry into the U.S. and, as time goes on, the very success of the quota restrictions in shielding American producers must surely be at the expense of producers in other countries to the extent that they sell on the basis of L.M.E. prices, which the quota must tend to depress.

This, of course, is not to say that the London market must continue to go down, or even that it will not rise, be-

cause other factors can, as always, decisively influence the future trend. For example, a big expansion of consumption outside, or even inside the U.S., or a large barter absorption of lead, or an effective restriction of exports and/or production outside the U.S., could work the other way.

In any event, it may well be that the New York lead market, now protected by the quota, will recover further in 1959. It would partly depend on the balance struck by reviving U.S. consumption on the one hand and recovering U.S. lead production on the other. At some price level, whether, say, 13.50, or 14.00 or 14.50 c. per lb., combined with some restored level of American domestic mine output, the U.S. Administration would, presumably, be prepared—or might even be forced by fears of shortage—to enlarge the import quota and this would stiffen the London market.

It is as hard to predict as ever. The American lead import quota is undeniably an important new feature which, from now on, seems likely to bear down on the London market. On the other hand, London prices are low enough to deter suggestions that they will fall further and there are also some bullish possibilities.

Looking ahead, much the same circumstances and possibilities apply to zinc as to lead. While the U.S. import quota, *per se*, should be a restraining influence on the London market in 1959, other factors may work to maintain, and even raise, London prices. There is the third international conference of zinc and lead producers which may take place in the next few months and which is concerned with price "stability". There are also some chances of renewed barter stockpiling by the U.S. Government. Of most promise and appeal, however, would be an expansion of world consumption—a recovery of lost ground in the U.S. and a renewed advance, after last year's pause, in other countries together. The time may well be ripe for another move forward.

In the case of tin the return of better times for the industry in 1959 seems to hinge more than anything on further industrial recovery in the U.S. But there does seem a good prospect that, in 1959, the buffer stock manager may be able to turn part of his holding of tin back into cash, which, after he has sold off the special fund tin, he may begin to do when the price reaches £781 a ton. Last, but not least, there is the hope that the present crippling curtailment of output can soon be alleviated.

LONDON METAL AND ORE PRICES, FEB. 12, 1959

METAL PRICES

Aluminium, 99.5%, £180 per ton	
Antimony—	
English (99%) delivered, 10 cwt. and over £190 per ton	
Crude (70%) £190 per ton	
Ore (60%) bases 19s. 6d./20s. 6d. nom. per unit, c.i.f.	
Arsenic, £400 per ton	
Bismuth (min. 1 ton lots) 16s. lb. nom.	
Cadmium 9s. 6d. lb.	
Cerium (99%) net, £16 0s. lb. delivered U.K.	
Chromium, Cr. 99% 6s. 11d./7s. 4d. lb.	
Cobalt, 14s. lb.	
Germanium, 99.99%, Ge. kilo/ots 2s. 5d. per gram.	
Gold, 24s. 7½d.	

ORES AND OXIDES

Bismuth		30% 5s. 0d. lb. c.i.f.
Chrome Ore—		20% 3s. 3d. lb. c.i.f.
Rhodesian Metallurgical (semifriable) 48% (Ratio 3:1)	...	£15 1s. 0d. per ton c.i.f.
Hard Lumpy 45% (Ratio 3:1)	...	£15 10s. 0d. per ton c.i.f.
Refractory 40% (Ratio 3:1)	...	£11 0s. 0d. per ton c.i.f.
Smalls 44% (Ratio 3:1)	...	£14 0s. 0d. per ton c.i.f.
Baluchistan 48% (Ratio 3:1)	...	£11 15s. 0d. per ton f.o.b.
Columbite, 65% combined oxides, high grade	...	nom.
Fluorspar—		£22 13s. 3d. per ton ex. works
Acid Grade, Flotated Material	...	156s. 0d. ex. works
Metallurgical (75/80% CaF ₂)	...	
Lithium Ore—		40s. 0d./45s. 0d. per unit f.o.b. Beira
Petalite min. 34% Li ₂ O	...	40s. 0d./45s. 0d. per unit f.o.b. Beira
Lepidolite min. 34% Li ₂ O	...	£25 0s. per ton f.o.b. Beira
Ambylgomite basic 7% Li ₂ O	...	£28 0s./£30 0s. d/d
Magnesite, ground calcined	...	£21 0s./£23 0s. d/d
Magnesite, Raw (ground)	...	
Manganese Ore—		nom.
Europe (46% - 48%) basis 57s. 6d. freight	...	nom.
Manganese Ore (43% - 45%)	...	nom.
Manganese Ore (38% - 40%)	...	nom.
Molybdenite (85%) basis	...	8s. 11d. per lb. (f.o.b.)
Titanium Ore—		£35/£36 per ton c.i.f. Aust'n.
Rutile 95/97% TiO ₂ (prompt delivery)	...	£11 10s. per ton c.i.f. Malayan
Ilmenite 52/54% TiO ₂	...	86s. 0d./90s. 0d. per unit c.i.f.
Wolfram and Scheelite (65%)	...	8s./8s. 11d. per lb. V ₂ O ₅ c.i.f.
Vanadium—		£14 0s. ton c.i.f.
Fused oxide 95% V ₂ O ₅	...	
Zircon Sand (Australian) 65 - 66% ZrO ₂	...	

QUICKSILVER METAL OUTLOOK

The general level of trading interest in quicksilver in London has been unimpressive. Available supplies of physical metal on the spot are fully adequate to meet the prevailing demand but are reported to be in strong hands. The London ex-warehouse price has been held at £74 per flask for over two months, following a reduction from £78. Prices

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have also become steadier in the U.S., where the progressive decline over recent months appears to have been arrested, despite the ending of the stockpile programme at the end of last year.

Nevertheless, dealers' confidence in the outlook has yet to be restored, for it is considered that prices still remain delicately poised. The resistance to further drifting is attributed in no small degree to the tenacity with which Spain and Italy have held at £80 per flask f.o.b. for more than a year. It remains to be seen how much longer both countries can hold the price. Italy might be the first to crack, especially because of her large accumulated stocks, which are thought to total between 30,000 and 60,000 flasks. Significance is also attached to an offer, emanating from a country in the Soviet bloc, at a price equivalent to about £76

on the spot in London. Will this be the forerunner of more competitive offers? It is further pointed out that the London spot price seems high in relation to the shipment price of, for example, Mexican metal, which is currently mentioned at about £69 per flask c.i.f.

INCO STAINLESS DRIVE

A major cross-Canada promotion effort aimed at increasing stainless steel markets and developing new fabricating sources in the consumer product field is being sponsored by International Nickel, in co-operation with T. Eaton Co. Ltd., from February 2-14. A simultaneous promotion in the U.S. involving 29 leading department stores will also take place.

COPPER · TIN · LEAD · ZINC

(From Our London Metal Exchange Correspondent)

As compared with prices a week ago, very little change has taken place, but it must be reported that the sentiment of the markets has altered considerably as there is now a general feeling that a time of consolidation has been reached and that there may even be a slight recession in prices. With the exception of lead this feeling has been brought about by events not connected with the metals themselves, such as the recent issue of the unemployment figures in both the U.S. and the U.K. and the behaviour of the stock market on Wall Street.

U.S. COPPER LOOKS STEADY AT 30 C.

The copper market has been relatively quiet with demand in the U.K. and from the Continent at a lower level than for some time past, combined with another fairly sharp rise in stocks in official warehouses at the beginning of the week. It is reported that this increase in stocks, amounting to 884 tons, contains a percentage of electrolytic wirebars. This is interesting in view of the discussions which are taking place everywhere about the desirability of trying to find an alternative pricing basis for long-term contracts other than the price quoted on the L.M.E. Total stocks, however, are still at the low figure of 5,595 tons, and in view of this, it is surprising that a small contango has developed in the market.

On the Continent the lower demand and decreasing prices in London have been reflected in a reduction in the Belgian copper price to the equivalent of approximately 29½ c. per lb., New York or Antwerp. In America, the producers and customs smelter prices remain unchanged at 30 c. per lb., and most reports speak of satisfactory business. It is understood that the intake of scrap to customs smelters has been more satisfactory during the last few days in view of the lower price in London, but in spite of this, customs smelters are not anxious to book orders for delivery beyond two months ahead.

Figures issued by the Bureau of Mines show that mine production of copper in the U.S. in 1958 was some 10 per cent below the previous year at 980,304 s.tons. This result is due largely to cutbacks by producers during the first nine months of

the year. These restrictions were removed during the last quarter and it is interesting to note that by December the output for the month had risen to almost 95,000 s.tons.

As has been stated in this report previously, it seems likely that for the next few months the copper price will be held at, or near, its present level by an increased offtake in America compensating for a smaller demand elsewhere. This picture can, of course, be completely altered if Iron Curtain countries come into the market in a big way or if labour trouble should break out in any of the producing centres.

TIN QUOTAS SHOWING RESULTS

The tin market has continued to show underlying strength with prices gradually climbing nearer to the £780 per ton mark. Demand both from Europe and America has remained satisfactory and with the present quota period being approximately half-way through, the premium for Straits Tin shows signs of increasing further. Stocks in official warehouses showed a further small decline over the week of 167 tons, giving a total of 14,461 tons, and it seems that the contango has been almost completely eliminated in the market.

Provided the producing countries maintain their export restrictions for another period it seems that nothing can prevent the market reaching the level at which the buffer stock manager can start to sell. It will be interesting to see whether, in fact, an attempt is made to dispose of sizeable tonnages at that figure or whether the manager will only dispose of small quantities on a rising market. The answer to this may lie in whether or not the reports are true which state that the special fund tin has almost been completely liquidated. On Thursday the Eastern price was equivalent to £807½ per ton c.i.f. Europe.

GROWING DIFFERENTIAL BETWEEN U.S. AND L.M.E. LEAD-ZINC PRICES

The lead and zinc markets remain under a cloud and, especially in the case of the former, there is an expectation

that the American price will be reduced further after the 0.50 c. per lb. reduction on Wednesday. During the week the Canadian price for lead has been reduced to 11 c. (Can.) per lb., and that for zinc to 11½ c. (Can.) per lb., basis f.o.b. Montreal/Toronto. There are rumours that more lead which has been shut out of the United States is now beginning to find its way to Europe, and in Mexico application has been made to the government for permission to export an additional tonnage of lead to markets outside the U.S.A. Demand for the metal continues to show no improvement and with the motor and battery trades probably due to take less over the coming months, the outlook is indeed unsatisfactory.

In the U.S. the Bureau of Mines has issued preliminary figures showing that the output of recoverable lead from U.S. mines during 1958 amounted to 266,000 s.tons, which was the lowest annual output of the century, being 21 per cent below that of 1957. In spite of this and of the introduction of quotas, there still appears to be a surplus tonnage of metal, and this is being aggravated by the import of lead semi-manufactured articles which can jump the tariff barrier due to the extremely large differential between the U.S. and London prices.

The zinc market, although weaker, has been mainly affected by the course of prices in the lead and copper markets rather than by any lessening of demand for the metal itself, and there are tendencies for the backwardation to increase again which may lead to a raising of the general price level providing sentiment in other markets permits. Demand is reported as being fair to good in most sections of the trade and if it were not for the fact of American quotas, the outlook for the London price would be good. But as in the case of lead, the time is drawing near when metal shut out of the U.S. will find its way in increasing tonnages on to the London market.

This state of affairs in the lead and zinc world may lead to the calling together of another international conference, but it is believed that sufficient preparatory work has not yet been done and the very divergent opinions which were expressed at the end of last year would merely be repeated and the conference once more prove abortive. In London it is generally hoped that free trade will once more be restored so that the laws of supply and demand will cause the high-cost producers to shut down and bring about a balance between production and consumption.

Closing prices are as follows:

	Feb. 5		Feb. 12	
	Buyers	Sellers	Buyers	Sellers
COPPER				
Cash ..	£231	£231½	£234½	£234½
Three months ..	£230	£230½	£234½	£234½
Settlement ..		£231½		£234½
Week's turnover	12,800 tons		9,125 tons	
LEAD				
Current ½ month	£70½	£70½	£69½	£70
Three months ..	£70½	£70½	£70½	£70
Settlement ..		£70½		£70½
Week's turnover	7,825 tons		8,300 tons	
TIN				
Cash ..	£770½	£771	£768	£768½
Three months ..	£771	£772	£768½	£769
Settlement ..		£771		£768½
Week's turnover	1,675 tons		965 tons	
ZINC				
Current ½ month	£71½	£72½	£73	£73½
Three months ..	£70½	£71	£71½	£71½
Settlement ..		£71		£71½
Week's turnover	6,200 tons		7,625 tons	

London Metal and Ore Prices appear on page 178.

Mining Finance

Copper Profits On The Move

By keeping up sales from stocks, and so taking advantage of the higher metal price that the labour strike on the properties brought about, Roan Antelope and Mufulira, the copper producers in the Rhodesian Selection Trust group, were actually able to increase their profits in the December quarter despite the fact that the bulk of the production stoppage caused by the strike, which lasted from September 13 to November 4, came into the period. The accompanying table shows clearly how sales were kept up despite lower output. It looks, in fact, as though the pipeline between the mines and their customers was never really empty. On the other hand, it is unlikely to have got completely back to normal until early in January, because on average it takes about eleven weeks for metal to reach the principal consumers, who are in the United Kingdom. Much of it has to travel some 9,000 miles.

There is something of a warning here. Sir Ronald Prain has said that it is hoped to have rebuilt stocks to normal levels by the end of the current financial year on June 30. This, allied to the fact that the effects of the strike could have carried on into the present quarter, may mean that the March reports due at the beginning of May could not possibly make a very

brilliant showing. Much naturally depends on the metal price. This is now £231 a ton, and in January averaged £230. In other words, it is to date running above the average received by Roan last quarter. The comparison with Mufulira is less simple, as that company gets a fairly large premium for its electrolytic high-purity metal.

The copper price is, of course, well above the averages for the six months to December 31 last, so there is every prospect that the overall recovery in profits from the low levels of 1957-58 will continue for the rest of the present financial year and that some improvement in dividends might be possible. The first signals in this respect should come early next month, when the Rhokana and Rhodesian Anglo American interims are due to be announced. Those of the R.S.T. group are usually considerably later in mid-May.

The estimated profit attributable to Rhodesian Selection Trust over the last half of 1958 from its 64 per cent interest in both Mufulira and Chibuluma is actually down compared with a year previously at £1,758,000 against £1,943,000, but this is a little misleading so far as dividend potentialities are concerned because the decline is due to the sharp setback in the Chibuluma earnings. This

	Dec. Qtr.	Sept. Qtr.	Six months to Dec. 31, 1958	Dec. 31, 1957
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Mufulira:

Output†	14,693	18,570	33,263	47,052
Sales†	21,254	22,119	43,373	45,059
Revenue‡	233.9	204.4	218.9	198.5
Cost§	155.1	141.5	148.2	142.3
Profit*	1,500	1,193	2,693	2,422

Roan:

Output†	13,465	15,647	29,112	39,815
Sales†	19,251	19,419	38,670	38,793
Revenue‡	223.6	190.8	207.1	187.7
Cost§	160.6	139.0	149.7	147.9
Profit*	997	813	1,810	1,486

Chibuluma:

Output†	3,160	3,741	6,901	14,563
Sales†	2,947	4,091	7,038	10,501
Revenue‡	212.4	193.8	201.6	195.0
Cost§	170.0	140.3	152.7	110.6
Profit*	23	117	140	690

* Before tax (£000s). † Tons.

‡ Per Ton (£).

company does not affect R.S.T.'s dividend income at this stage of its career because it is still engaged in paying off its loan to the United States Government, which stood at £3,972,800 on December 31.

The reason why Chibuluma's profits have fallen off so sharply is partly that the year to June 30 last was an abnormal one, in that the metal output considerably exceeded the mine's production rate, owing to the smelting of stocks of concentrate accumulated prior to June 30.

R.S.T. 5s. shares stand at 17s. 3d. to yield a mere 2.1 per cent on the 1957-58 dividend of 7d. gross. Similarly, Roan 5s. units at 8s. 7½d. only give 3 per cent on last year's 5d. gross. The market prices are thus in both instances already looking ahead to the better things to come even allowing for the fact that these yields take no account of D.T.R.

LONDON MARKET HIGHLIGHTS

In the earlier part of the week, South African gold shares seemed to be consolidating the sharp advance that had taken place previously. There was, however, no setback in prices, despite the inevitable end-Account profit-taking that occurred on Monday and Tuesday. For most of Wednesday prices were firm enough, but towards the close a sudden burst of buying caught the market on the wrong foot and shares of the newer mines surged ahead.

Earlier, a feature had been provided by Zandpan, the newcomer to the Klerksdorp area lying next door to Hartebeest. This mine is the only South African gold prospect still at the early shaft-sinking stage (Western Deep is rather more advanced) and as such is bound to attract speculative attention from time to time. After moving up from 18s. 6d. to 19s. 9d. on Cape demand, Zandpan were carried up to a peak of 21s. 10½d. during Wednesday's upswing. "Freddies" (11s. 3d.) also moved ahead, being still helped by news of the resumption of drilling operations south of the Vaal river. Talk of good development values in the No. 2 shaft area attracted attention to St. Helena (60s.) and Merriespruit (7s. 10½d.) benefited from Cape-inspired rumours of good gold values being found in the drive being pushed into the property from the neighbouring Virginia.

The finance shares experienced a steady investment demand. Anglo American Corporation crossed £9 a share for the first time since 1955 to the accom-

paniment of hopes that an increase in dividend could easily be forthcoming. Also wanted were Anglo French (29s. 6d.) and New Wits (10s. 6d. x.d.).

Platinum shares were remarkably firm despite the Rustenburg chairman's review of the uncertain outlook at last week's meeting. Potgietersrust were notably better at 6s. 10½d. There was little doing in diamond shares, but De Beers seemed a firm enough market at around 129s. 4½d.

Wall Street again dictated the course of copper share prices, but it was noticeable that few sellers appeared when prices were lowered. M.T.D. Mangula stood apart from all this by steadily rising during a huge turnover to a new peak of 11s. 4½d. The dividend news from Chartered pleased the market, and at one time a strong investment demand lifted them to 82s. 6d. But the December quarter's profits announced by R.S.T. and Roan, while showing an unexpected increase, failed to stimulate the prices of either of the shares concerned.

Tin shares brightened following the fresh improvement in the metal price. There were also hopes that next week's meeting of the International Tin Council might see its way clear to announcing a relaxation of the output restrictions now levied on the producing mines. These quotas cut production by 48 per cent of that in a basic period: talk was heard that the quotas might be eased to the 40 per cent originally imposed in December, 1957.

GOOD CHARTERED DIVIDEND

The British South Africa Company does not actually produce copper, but it gets royalties, based on a scale that fluctuates with the price, from the metal that is produced on the Northern Rhodesian Copperbelt. Chartered, to give it its popular name, is also building up an impressive investment portfolio against the day in 1986 when the right to these royalties will pass to the Northern Rhodesian Government.

Meanwhile, Chartered's fortunes are still very much wrapped up with those of copper. Stockholders should thus account themselves fortunate in that for the year to September 30 last, not a good period for that metal, they are to receive a final dividend of 3s. 3d. per 15s. unit plus a special interim of 9d. on account of 1958-59. In effect, this means that the total for 1957-58 has been restored to the 5s. 3d. paid for the year to September 30, 1956, which was a boom time for copper.

The explanation for this good distribution is that the company qualifies for the Overseas Trade Corporation tax concessions so far as its African revenue is concerned. Consequently, although the consolidated profit for last year was down from £10,918,141 to £7,971,197, a sharp fall in the tax charge from £6,087,645 to £3,607,980 means that the net surplus is only £467,279 lower at £4,363,217. This amply covers the dividend which, including the special interim, requires £2,644,577.

On a 5s. 3d. dividend basis Chartered

units at 79s. 6d. ex-dividend yield 6.6 per cent. which is an attractive return for a share of this calibre that has become very much of a favourite with the unit trusts. This factor tends to have a bullish influence on the price by reducing the floating supply of stock. Moreover, the company's royalty revenue should be rising in the current financial year.

CAMP BIRD—WHAT NOW?

What does a shareholder in Camp Bird do now? This former mining finance company in the Gold Fields group came under new control headed by Mr. John Dalgleish in 1955. Since then it has become predominantly interested in United Kingdom industrial undertakings. It came back into mining prominence last December with a bid, subsequently abandoned, to take over a major role in Ghana's mineral industry. As a result, dealings in the 10s. shares were suspended by the Stock Exchange Council on December 12. They were not allowed to be resumed until January 30. The price at the suspension was 12s. 4½d. It is now 10s. 3d.

In the meantime, Mr. J. C. George, M.P., has sought the requisitioning of an extraordinary meeting in order to appoint a shareholders' committee to investigate the company's affairs. The nominations for this committee consisted of Mr. George and two chartered accountants, Mr. H. A. Benson, of Cooper Bros. and Co., and Mr. H. L. Layton, of Turquand Youngs and Co. Supporting proxies from 40 per cent of the shareholders by number have been claimed for this move.

Finally, last week-end the directors of Camp Bird, who had promised on January 19 a circular "within the next few days", stated that they were themselves seeking a Board of Trade investigation into the company's affairs, and would call an extraordinary meeting for this purpose.

In these circumstances, shareholders appear to have two major courses open to them. They can sell the shares, although to do so now would be to sell at a time when the price is particularly depressed. Otherwise there can hardly be anything to lose by supporting the projected shareholders' committee, as there is always the chance that the Board of Trade might not agree to the directors' proposals for an investigation. In such an event, shareholders could, by supporting Mr. George, at least make certain that there was some kind of an inquiry. It is high time that shareholders knew where they stood.

A 10 per cent interim dividend has been declared by the company in respect of the year ending April 30, 1959. Interim of 6½ per cent and 3½ per cent were paid for the previous year when a 10 per cent final made a 20 per cent total. On this news the shares have risen to about 11s.

In a statement issued by the group yesterday, it was announced that net profits before tax for Camp Bird Ltd. itself (the parent company) for nine months to January 31, 1959, were £225,412 against £205,270 in the corresponding period a year ago. Profits from the operating companies in the group for six months to October 31, 1958, were £289,721 compared with £284,051. The profit figures for the parent company are stated not to include any dividends from the operating companies during the current financial year.

Financial News and Results

A.S.A.I.C. Asset Valuation.—Between the commencement of business on September 23 and the end of the year the American-South African Investment Co.'s portfolio appreciated by \$4,127,131. Net assets at the year-end are estimated to have been equivalent to \$30.05 per share compared with \$25.80 at the commencement of business. Since then, the portfolio will, of course, have benefited further from the recent sharp rise in the Kaffir market. A.S.A.I.C. is stated to have invested about \$1,200,000 since the end of the year—mainly in gold shares.

Lorraine Issue.—Reference was made here, in our issue of January 30, 1959, to the terms of the Lorraine Gold Mines issue. The full details published since then disclose that the offer is to Lorraine shareholders registered on February 18 and that the offer closes on March 23. Renounceable allotment letters will be posted to shareholders on March 9. The offer to U.K.-registered shareholders is still subject to Treasury consent.

Some Recent Dividends.—The International Nickel Co. of Canada has declared a quarterly dividend of 65 c. (U.S.) per share payable March 20. This is the same as for the preceding four quarters.

Vereeniging Estates has declared a final dividend of 5s. per £1 stock unit (payable February 17) making a total distribution for 1958 of 8s. compared with 7s. 6d. in 1957.

New Witwatersrand Gold Exploration Co. has declared an interim dividend of 2½ per cent, equivalent to 1½d. per 5s. share. (The same interim as last year.)

Mount Morgan has declared an interim of 9d. (Aust.) on the ordinary stock payable March 31 compared with 1s. interim a year ago.

Algoma Shares for Rio Tinto.—Following its recent meeting, the board of the Rio Tinto Mining Co. of Canada Ltd. announces that it will exercise its rights to purchase 592,150 shares of Algoma Uranium Mines Ltd. These rights are held in the form of share purchase warrants which entitle the holders to purchase shares of Algoma at \$11 per share until March 2, 1959, when the rights expire.

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JANTAR NIGERIA

The forty-sixth annual general meeting of Jantar Nigeria Co., Ltd., was held on February 5 in London.

Mr. C. A. P. Tarbutt, Chairman and Managing Director, presided.

The following is an extract from his Statement circulated with the Report and Accounts for the year ended September 30, 1958:—

Production—Output for the year was 237 tons Tin and 194.5 tons Columbite. This compares with 279.5 tons Tin and 255.5 tons Columbite produced last year. For approximately nine months of the year under review our Tin production was restricted under the terms of the International Tin Agreement.

Columbite—Despite the limited demands for Columbite, the whole of our output for the year was sold but at steadily deteriorating prices. Recently there has been an increase in demand for the product which has enabled us to sell the whole of our output for 1958-59 under contract at prices to be negotiated quarterly. Whilst at present the price of Columbite is still depressed, it is hoped that if the increased demand continues the price will reach a more satisfactory level.

Tin—For the first three months of the year our output of Tin was unrestricted, but from December 1957, to the end of the financial year our output was controlled by the International Tin Council. As a result our output was approximately halved and on the basis of our permitted output for the half year to March 31, 1959, we shall only be allowed to produce approximately 140 tons for the financial year ended next September.

Basalt Lead—In my statement last year I said if Tin restriction remained in force beyond the initial period of three months, re-organization of the Company's operations would become necessary.

The permitted output allowed us for the Basalt Lead was 5 tons per month, at which figure production from this operation was uneconomic.

Your Directors, therefore, had no alternative but to cease operations on the Basalt Lead until such time as restriction is ended and the price of Tin becomes such that working the Lead becomes profitable.

A considerable amount of money has been spent in developing the Basalt Lead, and your Directors having regard to existing circumstances consider it prudent to write off £50,000 from the Basalt Lead Account in the Balance Sheet, and this sum has been charged against General Reserve.

General—The drastic restriction of tin production necessitated the dismissal of some of our employees, both European and African. Your Directors did this with great regret but had no alternative if the output allowed us was to be produced with the maximum economy.

Net profit for the year after taxation amounts to £15,547. Adding to this the amount brought forward from last year of £12,774 the balance standing at the credit of Profit and Loss Account is £28,321.

Your Directors recommend that a dividend of 3d. per Stock unit, less income tax at 8s. 6d. in the £, be paid and that the sum of £15,383 be carried forward.

I wish to thank the Manager and his staff for their services during the year.

The report and accounts were adopted.

Book Reviews

United Nations Peaceful Uses of Atomic Energy, vols. 2 and 3 (846 pp. and 610 pp. respectively). Published by the Sales and Circulation Section, Department of Public Information, United Nations, New York, U.S.A. Obtainable from United Nations sales agents throughout the world. Prices: Vol. 2, \$U.S.18.50, £6 12s. (sterling), Sw. Fr. 80.00; Vol. 3, \$U.S.15.00, £5 6s. (sterling), Sw. Fr. 64.00.

More than 2,100 papers were submitted by the nations, the specialized agencies, and the International Atomic Energy Agency, which participated in the Second United Nations International Conference on the Peaceful Uses of Atomic Energy, held at Geneva in September, 1958. The immense task of assembling and editing all this material for publication has been undertaken by a scientific editorial team under United Nations auspices. The complete proceedings occupy no fewer than thirty-three volumes, constituting a comprehensive and up-to-date encyclopedia of knowledge which has been made available in this new field. The task of printing this very large collection of scientific information has been shared by printers in Canada, France, Switzerland, the United Kingdom, and the United States.

Of most direct interest to the mining industry are volumes 2 and 3. Entitled "Survey of Raw Material Resources", the former has sections devoted respectively to raw material supplies; geochemistry; and mineralogy, geology, and prospecting. Volume 3 has as its subject

"Processing of Raw Materials", and has two sections covering respectively mining aspects and instrumentation, and ore treatment.

A number of articles based on the proceedings of this Conference have previously been published in *The Mining Journal* August 19, 1958, September 19, 1958, October 24, 1958, October 31, 1958, December 5, 1958, and December 19, 1958.

Economics for the Mineral Engineer, by Edmund James Pryor. Published by Pergamon Press, London. 215 pp. with 28 pp. of glossary.

The author (who is Reader of Mineral Dressing at the R.S.M.) has succeeded in producing a book which is useful and worth reading by both the student and those laymen interested in the mineral industry. Perhaps its greatest value lies in the fact that it is probably the first attempt to produce a treatise on economics primarily for the student of mineral dressing as opposed to one specifically for the mining engineer, of which there are a number.

It is certainly essential that the mineral dresser should be well acquainted with the economic aspects of not only his own particular field, but also of the wider organization of which his department is an integral part.

In twelve chapters, the author covers some elementary mining, including prospecting and sampling, the rudiments of mine valuation, an outline of general

book-keeping as well as the more specialized mine accounting, managerial structure, the records required in connection with milling, mill management, new construction, starting up and running in plants, and marketing the finished product. The importance of a thorough grasp of economics plus managerial ability in addition to technical skill is also rightly stressed. Many mining engineers will not agree with the author's classification of orebodies, and it is a pity that the definition of "ore" given by the I.M.M. is not quoted.

The definition given, viz. "a naturally occurring complex of minerals from which any fraction of commercial value can be extracted and used . . ." is open to loose interpretation, as the *economic* factor is neglected. On the basis of this definition, one could include almost any rock or detrital deposit, as one could recover aluminium from any kaolinized rock, but only at considerable financial loss, to cite one example only.

More attention could also have been given to the problem of accuracy in sampling, particularly the mathematical aspect, as well as to stores and their control, whilst a few pages could well have been devoted to work-study and to statistical analysis.

The chapter on marketing is excellent, stressing the difficulties in marketing non-metallic minerals, but perhaps a little more emphasis could have been put on the effect of penalties for fractional impurities in certain concentrates.

The book concludes with a comprehensive glossary which should prove most useful to both the student and general reader.



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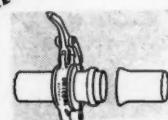
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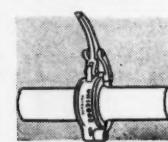
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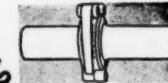
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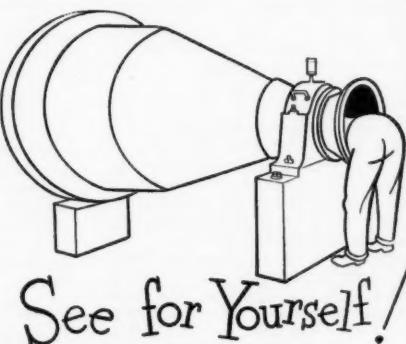
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